FIG. 1

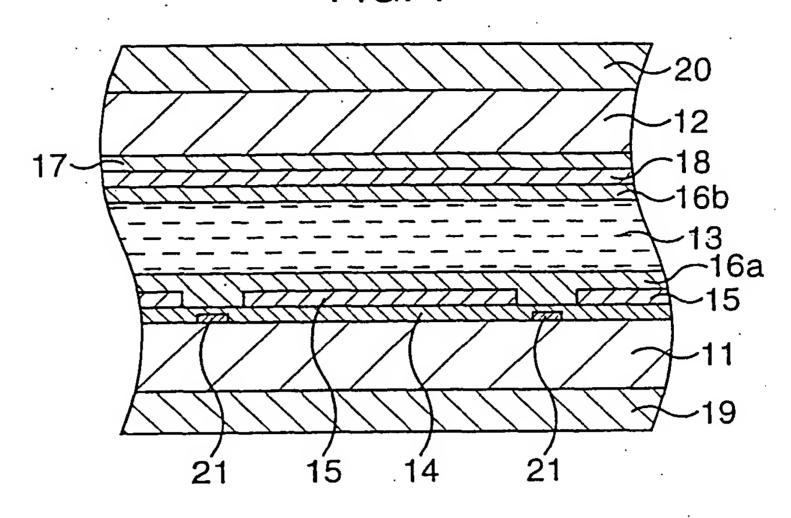


FIG. 2A

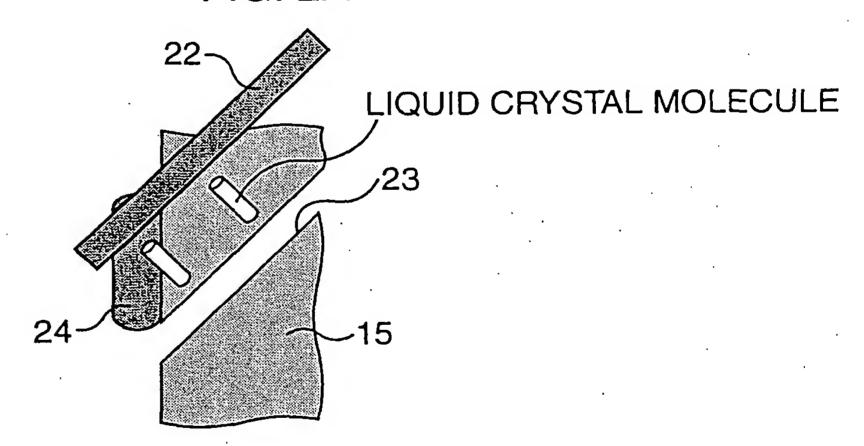


FIG. 2B

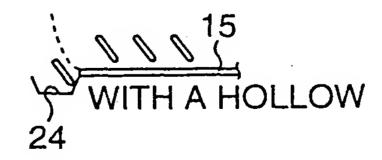


FIG. 2C

DARK LINE

15

WITHOUT A HOLLOW

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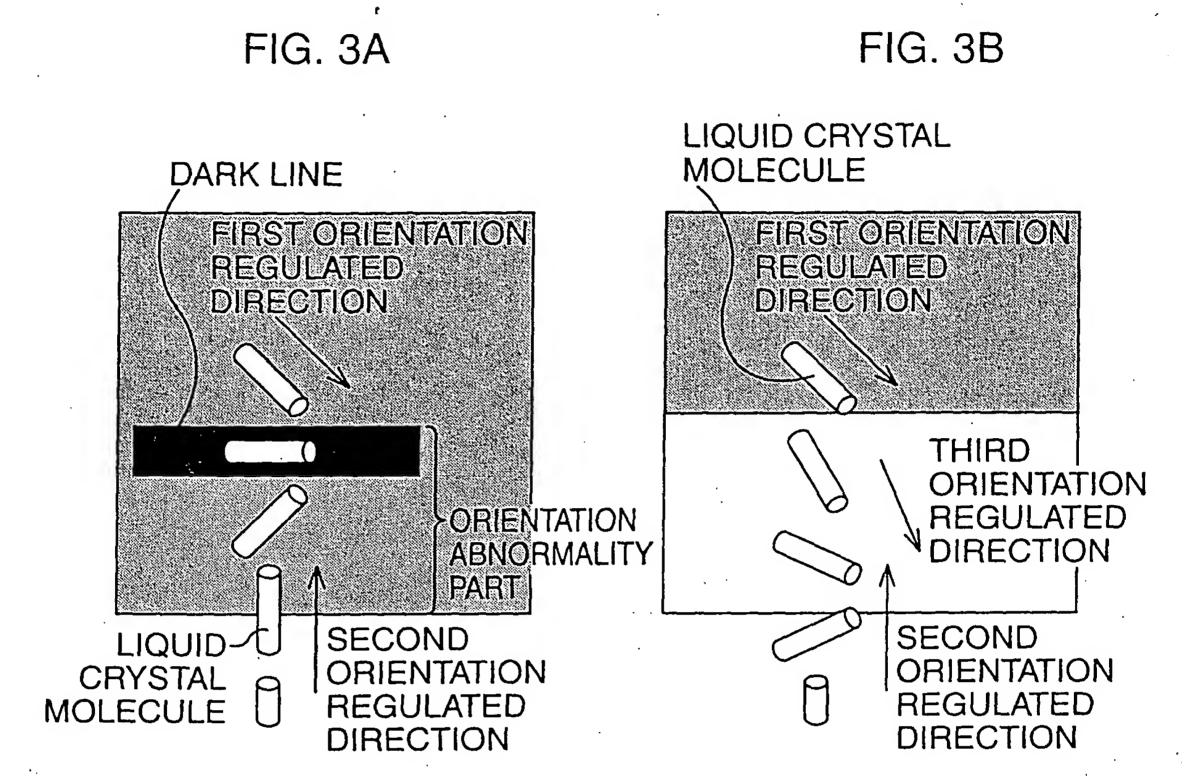
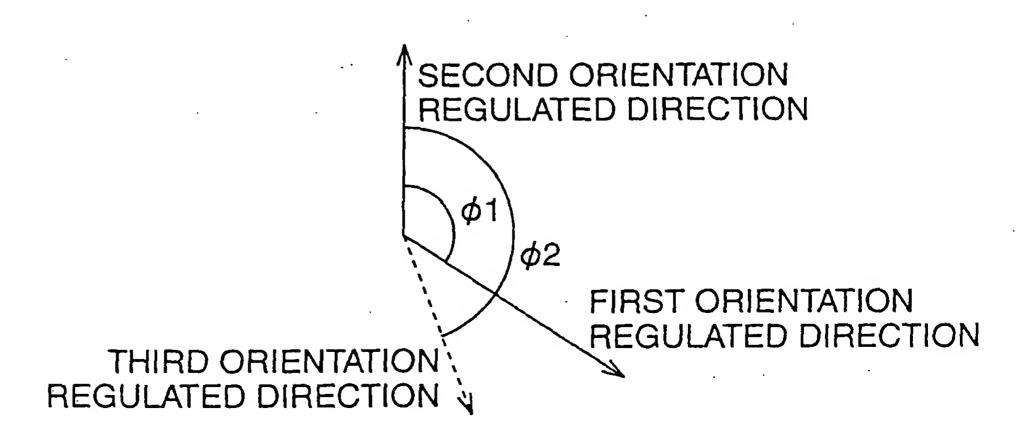


FIG. 3C

CONVENTIONAL



**GIVE A THIRD** 

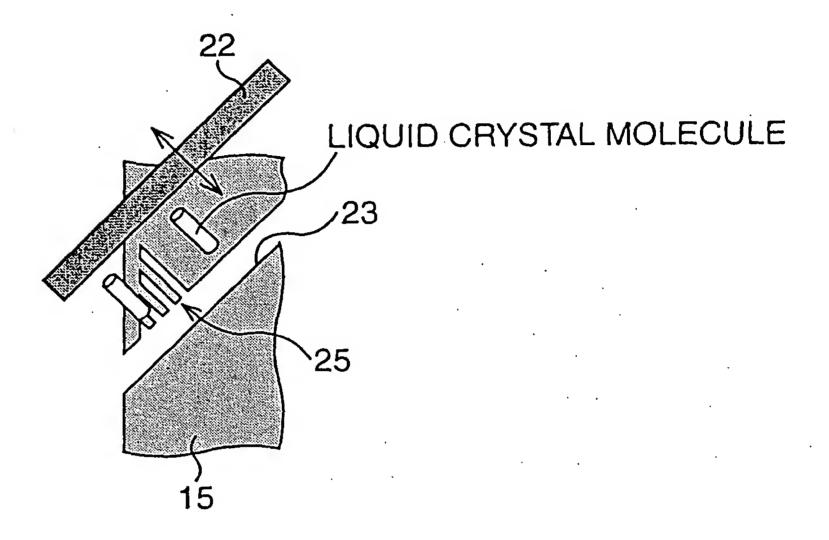
REGULATING FORCE

RELATION BETWEEN DIRECTIONS OF ALIGNING FORCE AND ANGLES

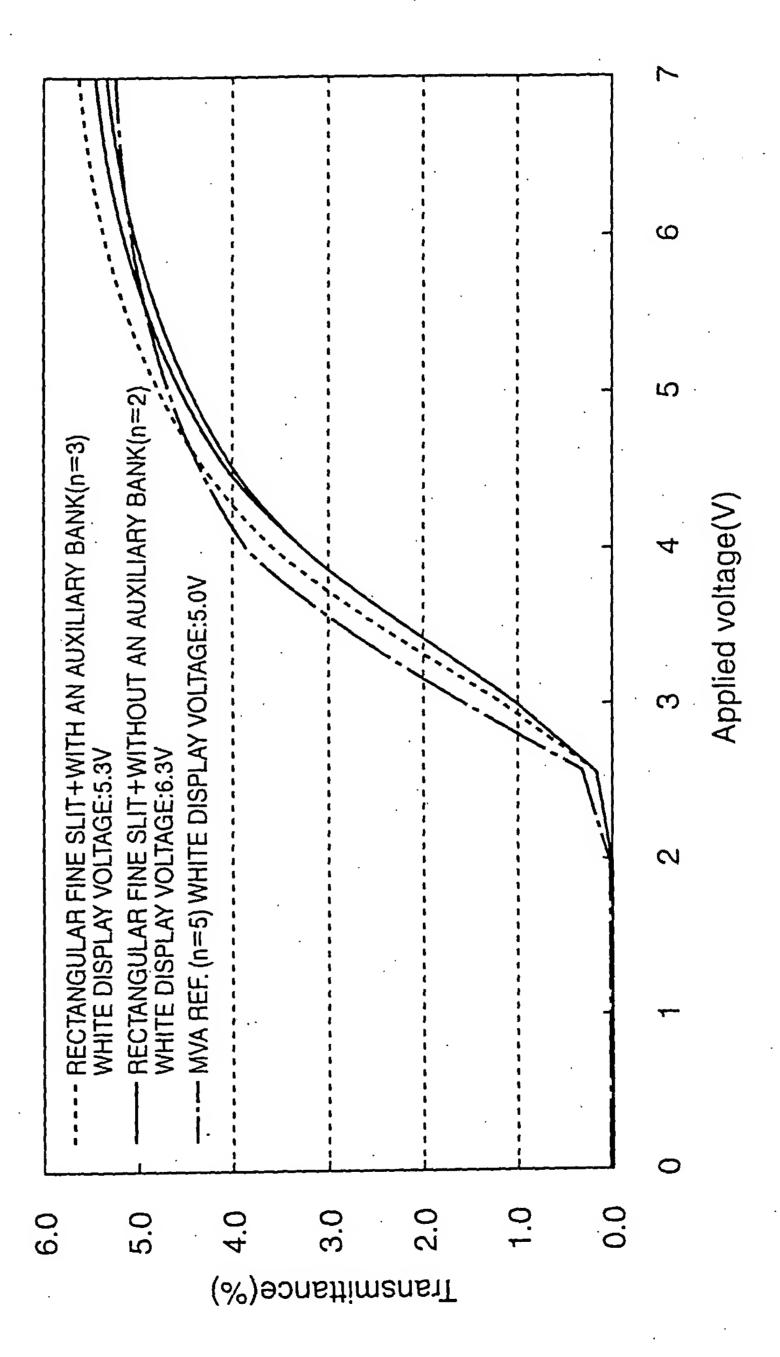
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FIG. 4







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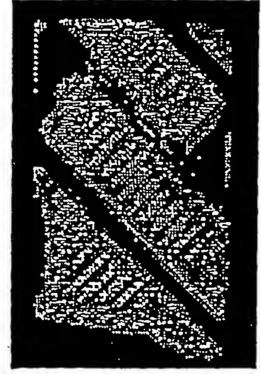
FIG. 6A

FIG. 6B

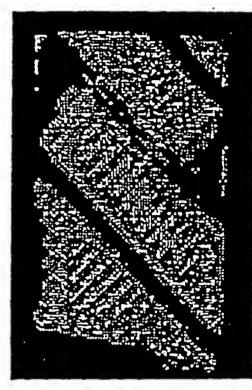
FIG. 6C



**APPLIED VOLTAGE: 3V** 



**APPLIED VOLTAGE: 4V** 



APPLIED **VOLTAGE:5V** 

FIG. 6D

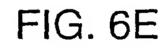
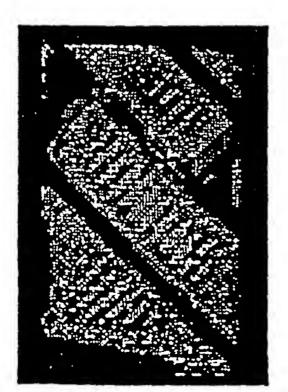
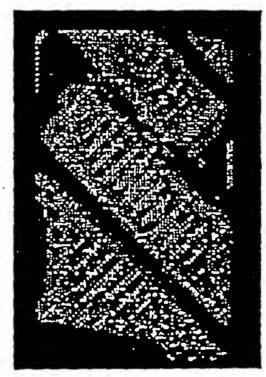


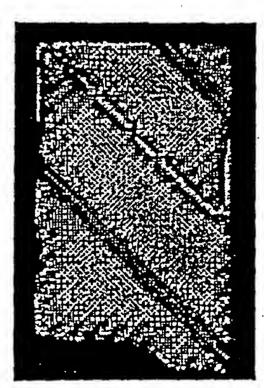
FIG. 6F



**APPLIED VOLTAGE: 6V** 



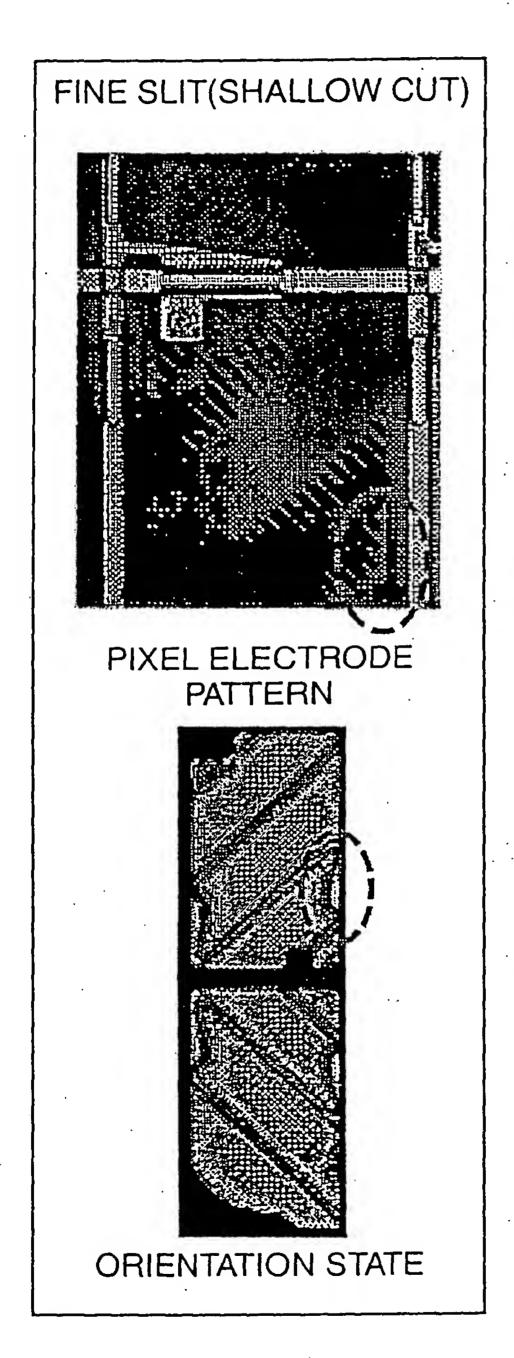
**APPLIED VOLTAGE:7V** 

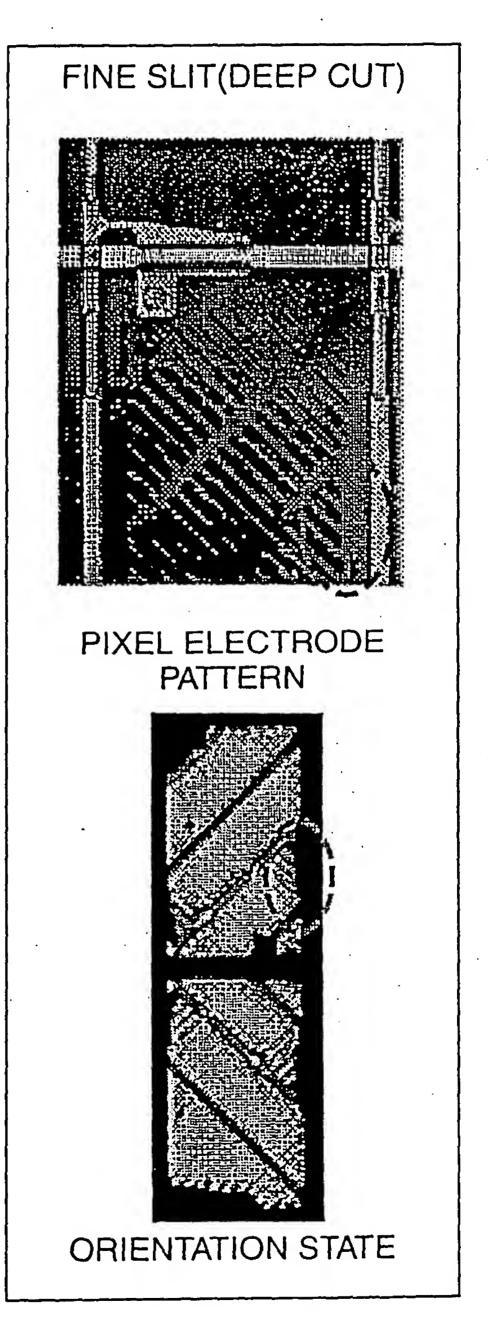


**APPLIED VOLTAGE: 8V** 

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FIG. 7





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FIG. 8

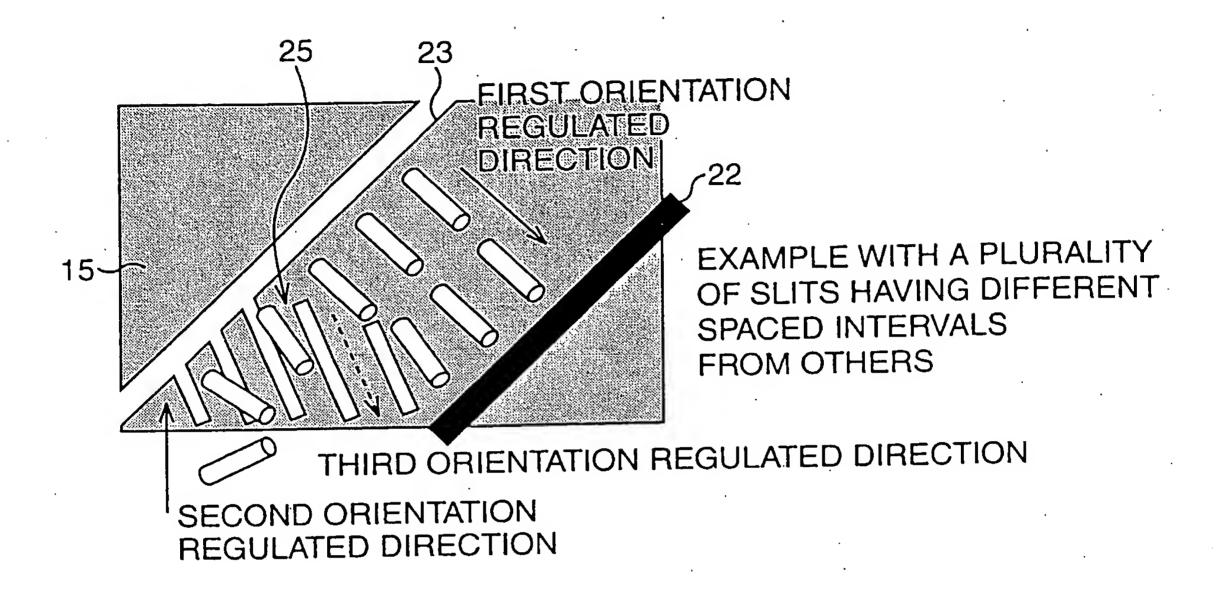
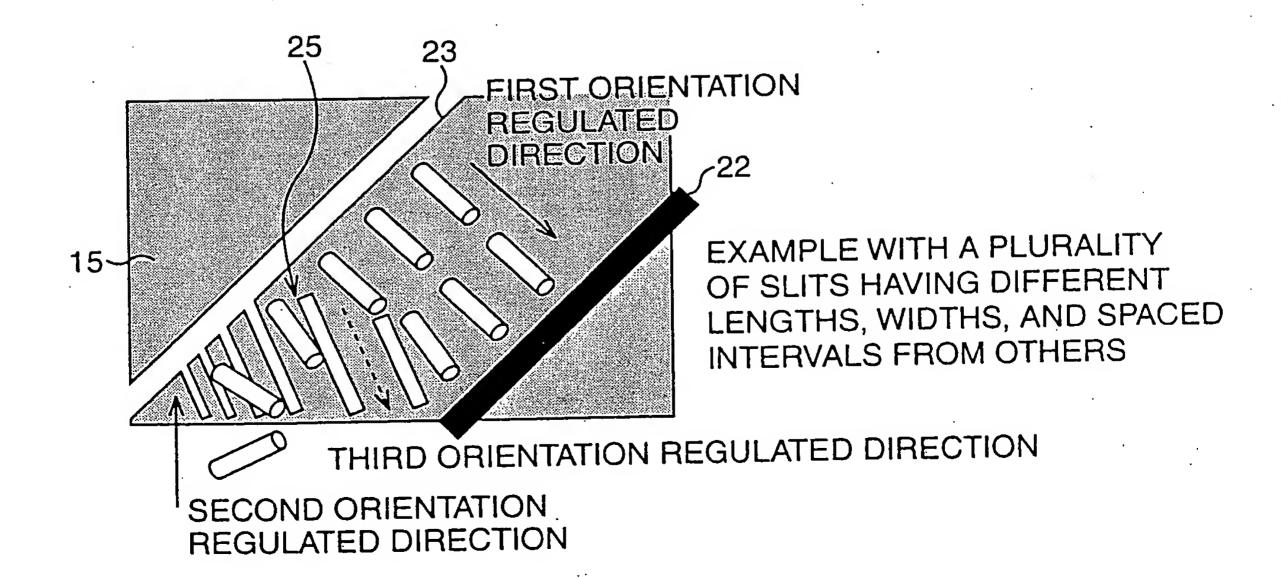
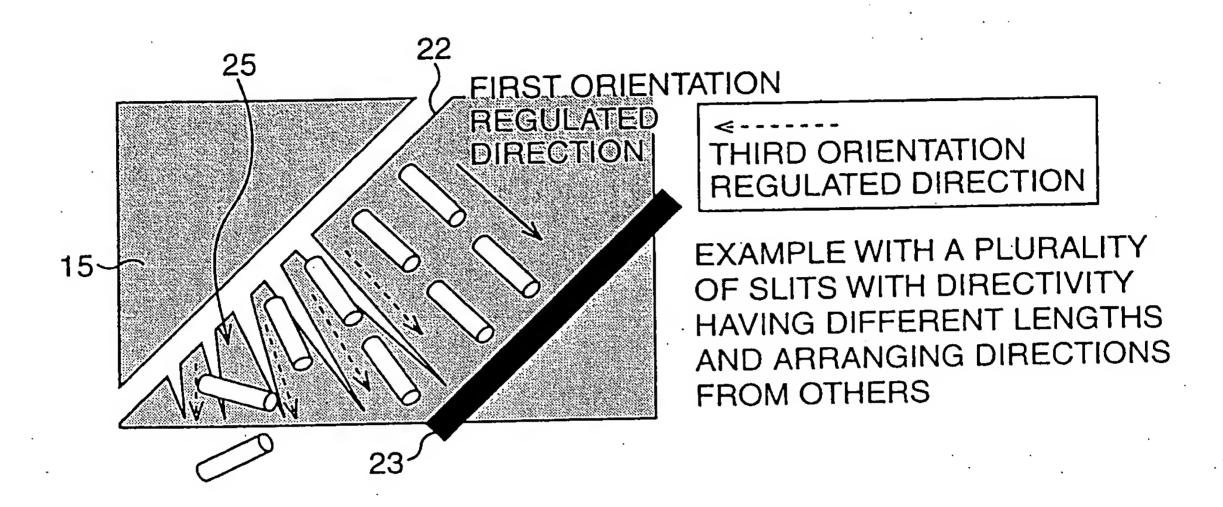


FIG. 9



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FIG. 10



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FIG. 11

| •                      | ①WITH<br>AN AUXILIARY<br>BANK   | ②WITHOUT<br>AN AUXILIARY<br>BANK   | ③CHANGE THE<br>DIRECTION OF<br>AN AUXILIARY<br>BANK   |
|------------------------|---|--|---|
| STRUCTURE              | PROTRUSION OF SUBSTRATE  PIXEL ELECTRODE ON TET SUBSTRATE   | DARK LINE  |   |
| TRANSMITTANCE          | 1   | 0.9  | 0.95  |
| MISALIGNMENT<br>MARGIN | ×   | 0  | Δ   |
| FEATURES               | ·LIQUID CRYSTAL ORIENTATION OF A PIXEL EDGE CHANGES GREATLY DUE TO DEVIATION AMONG EACH SHOT AND IN PASTING (A LARGE DEGREE OF TRANSMITTANCE CHANGE) ·NO DARK LINE ON A PIXEL EDGE (A LARGE DEGREE OF IMPROVEMENT IN TRANSMITTANCE) | ·LIQUID CRYSTAL ORIENTATION OF A PIXEL EDGE CHANGES DUE TO DEVIATION AMONG EACH SHOT AND IN PASTING (TO A SMALL DEGREE) ·OCCURRENCE OF ONE DARK LINE ON A PIXEL EDGE (A LARGE DEGREE OF DECREASE IN TRANSMITTANCE) | ·LIQUED CRYSTAL ORIENTATION OF A PIXEL EDGE CHANGES DUE TO DEVIATION AMONG EACH SHOT AND IN PASTING ·NO DARK LINE ON A PIXEL EDGE |

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FIG. 12

|                        |   | ·   |
|------------------------|---|---|
|                        | 4HOLLOW IN<br>A PIXEL EDGE  | ⑤FINE SLITS<br>+CONNECTION<br>AT THE END  |
| STRUCTURE              | HOLLOW  | CONNECTION  |
| TRANSMITTANCE          | 0.92  | 0.95  |
| MISALIGNMENT<br>MARGIN | 0   | <b>©</b>  |
| FEATURES               | ·LIQUID CRYSTAL ORIENTATION OF A PIXEL EDGE CHANGES DUE TO DEVIATION AMONG EACH SHOT AND IN PASTING (WITH A MARGIN) ·NO DARK LINE ON A PIXEL EDGE | ·LIQUID CRYSTAL ORIENTATION DOES NOT CHANGE EASILY DUE TO DEVIATION AMONG EACH SHOT AND IN PASTING (WITH THE LARGEST MARGIN) ·NO DARK LINE AT A PIXEL EDGE (TRANSMITTANCE UNDER IMPROVEMENT) ·TRANSMITTANCE IS IMPROVED GREATLY AT A DRIVING VOLTAGE OF 6V OR HIGHER (EQUAL TO ①) |

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FIG. 13

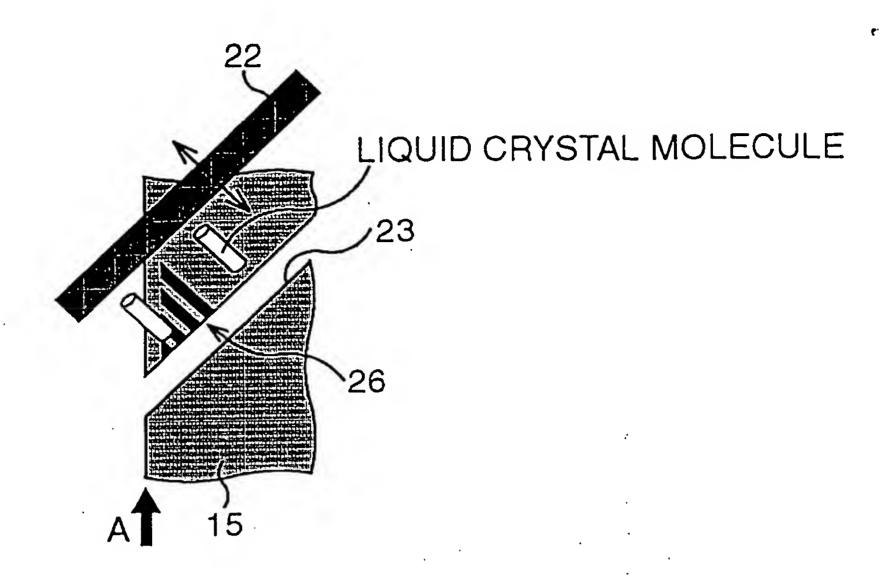


FIG. 14A

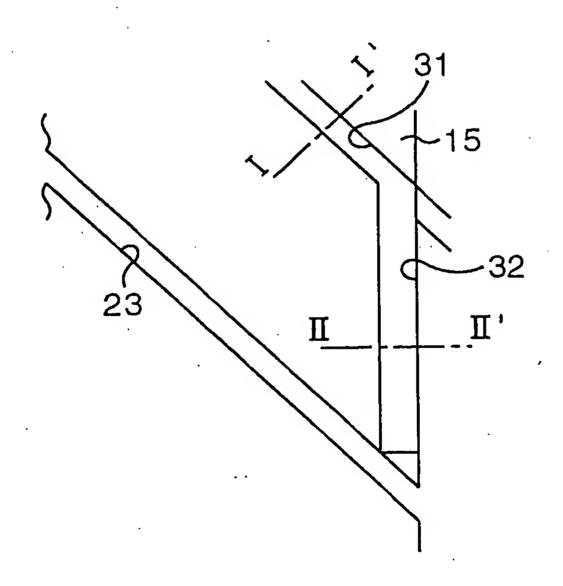
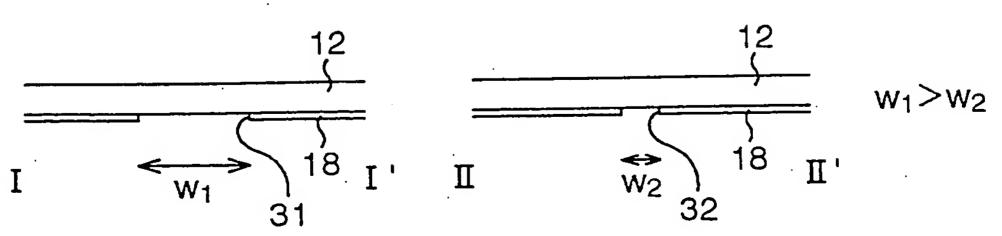


FIG. 14B



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FIG. 15A

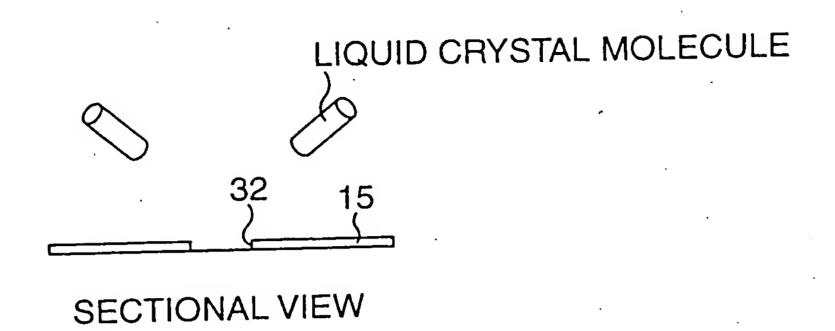
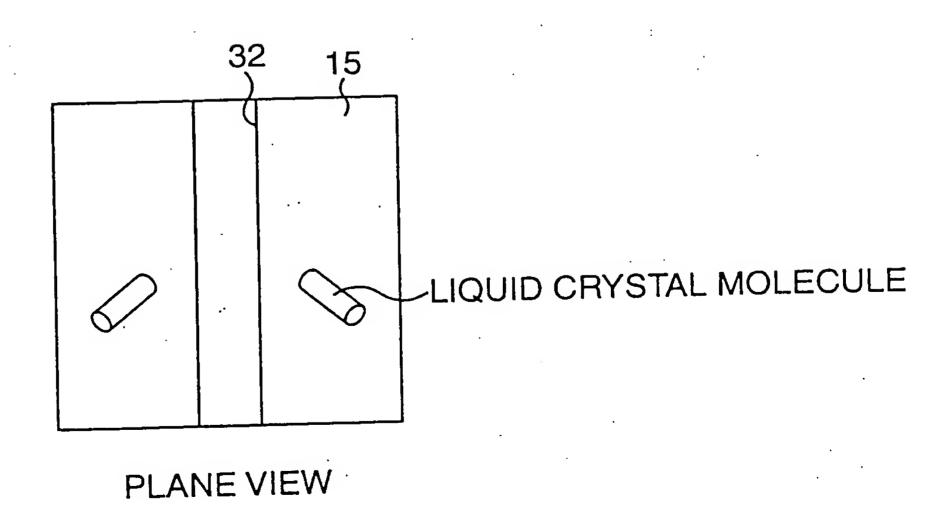


FIG. 15B



LIQUID CRYSTAL DISPLAY DEVICE . . .

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FIG. 16A

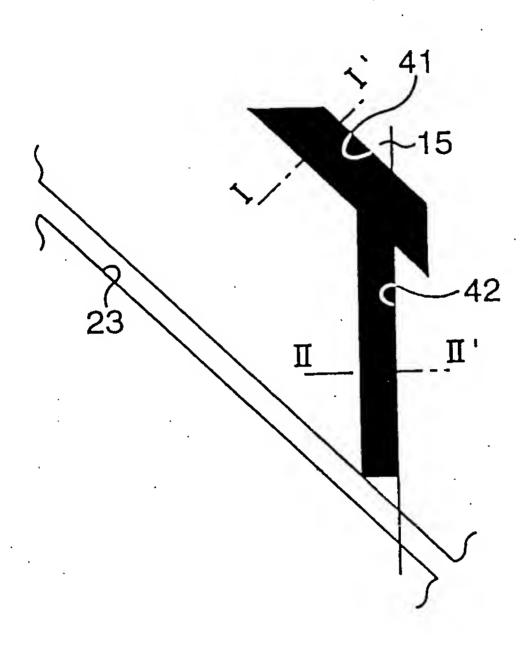
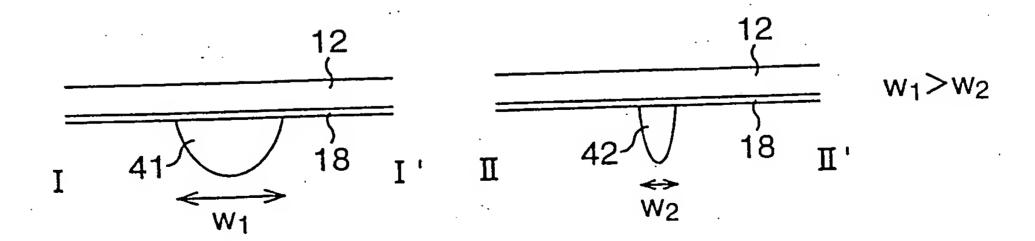


FIG. 16B



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FIG. 17A

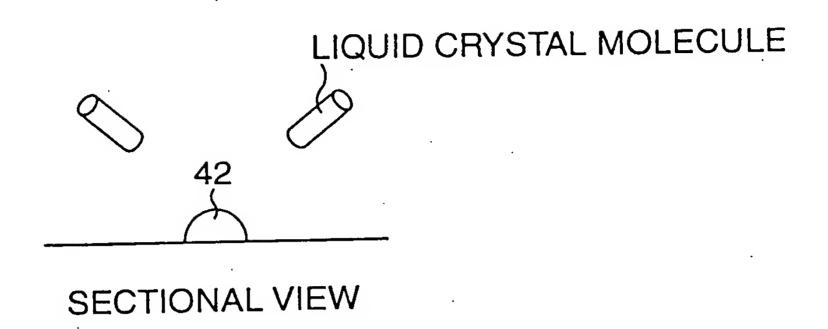
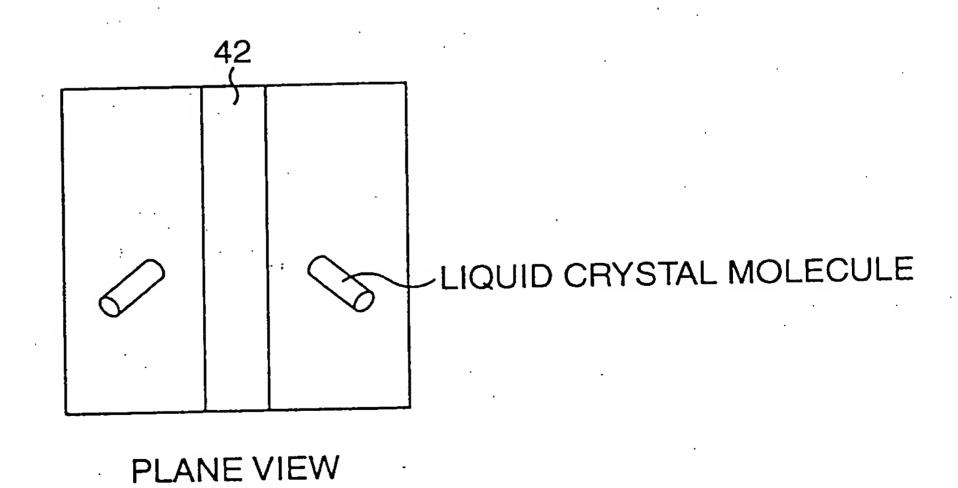
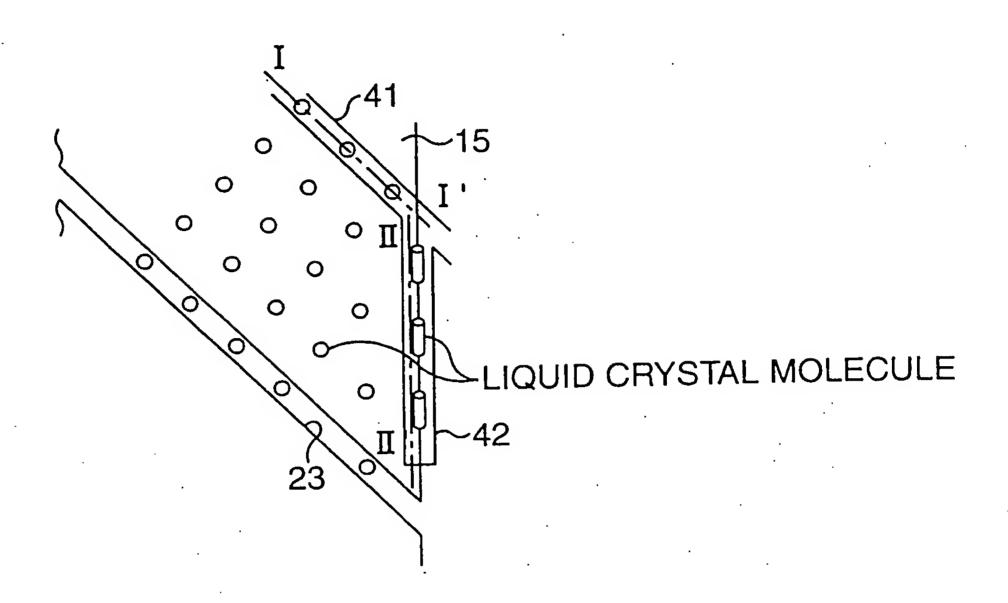


FIG. 17B



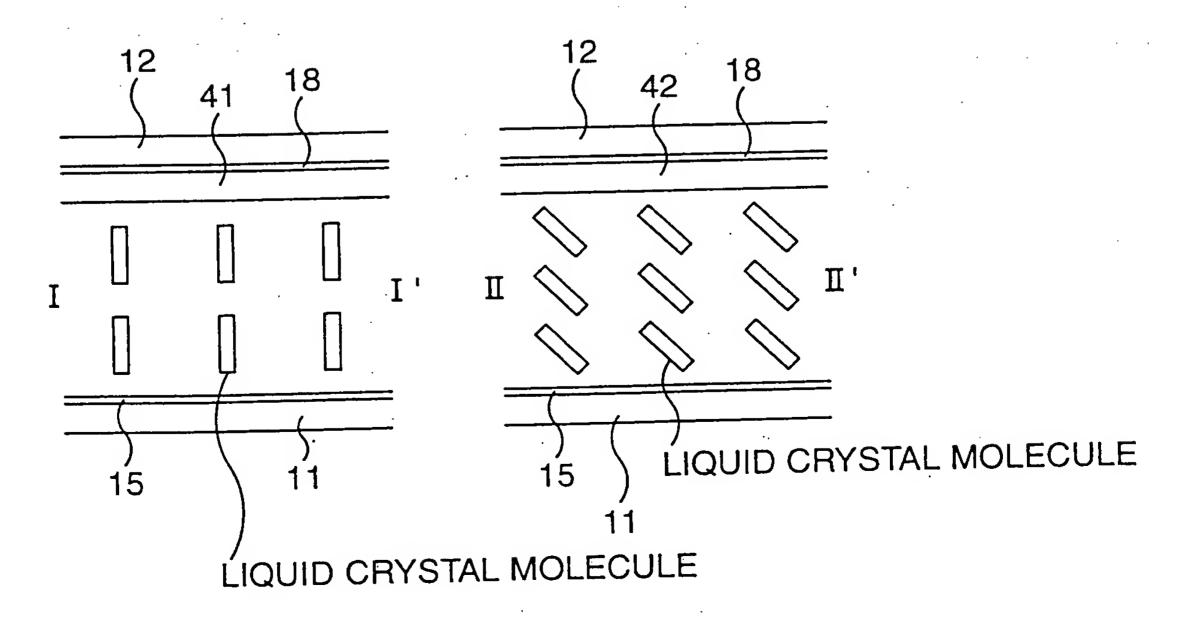
LIQUID CRYSTAL DISPLAY DEVICE . . .
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FIG. 18A



PLANE VIEW

FIG. 18B



SECTIONAL VIEW

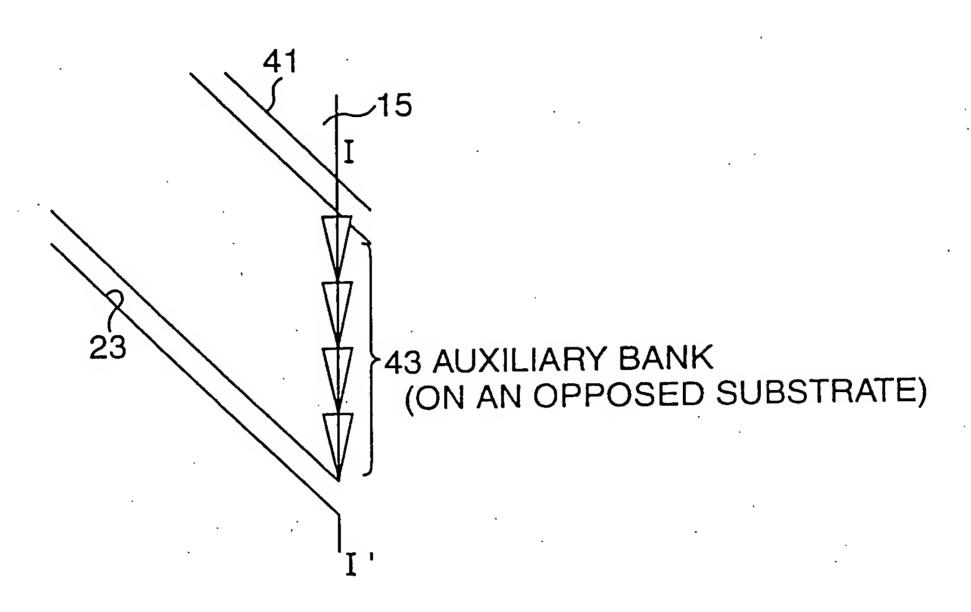
LIQUID CRYSTAL DISPLAY DEVICE . . . Takeda et al.

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Ref. No. 1117.68335

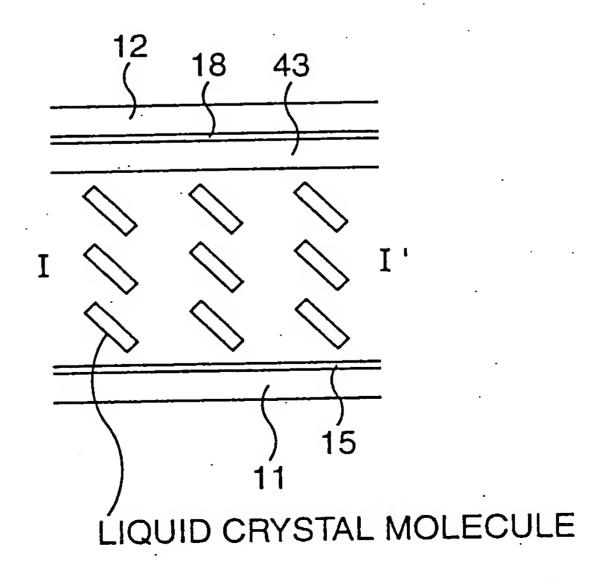
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FIG. 19A



**PLANE VIEW** 

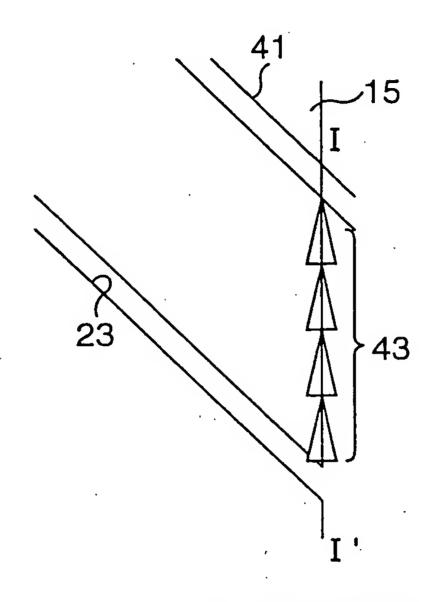
FIG. 19B



SECTIONAL VIEW

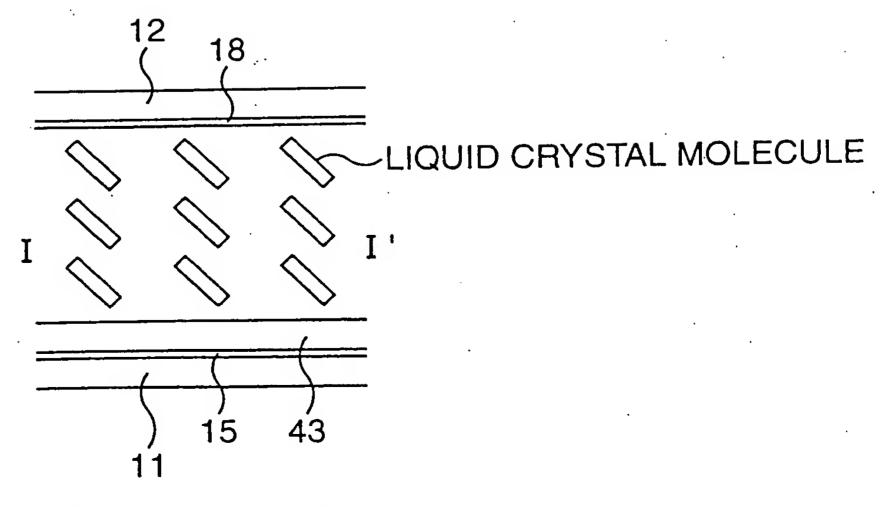
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FIG. 20A



PLANE VIEW

FIG. 20B



SECTIONAL VIEW

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FIG. 21A

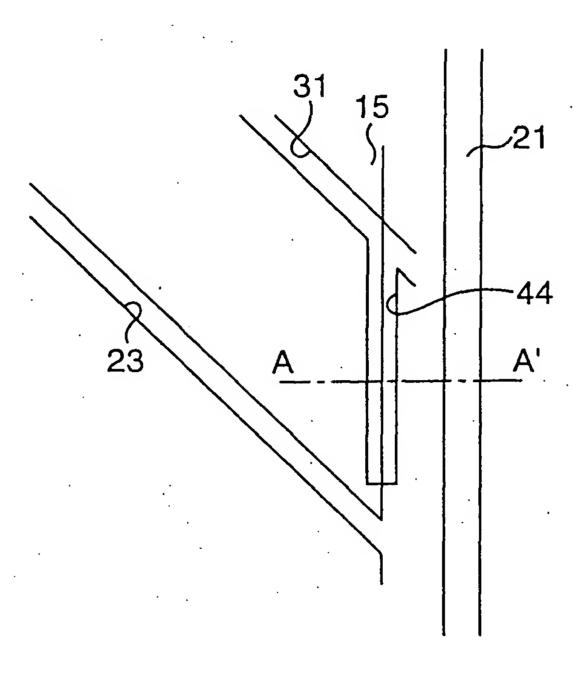
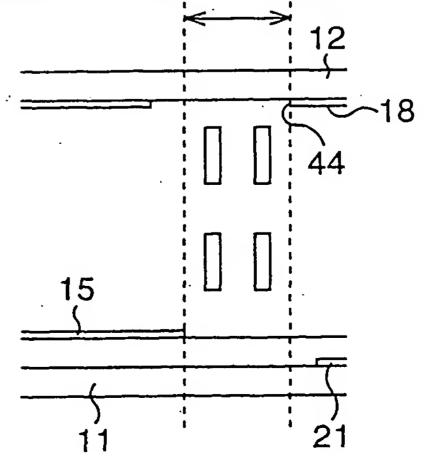


FIG. 21B

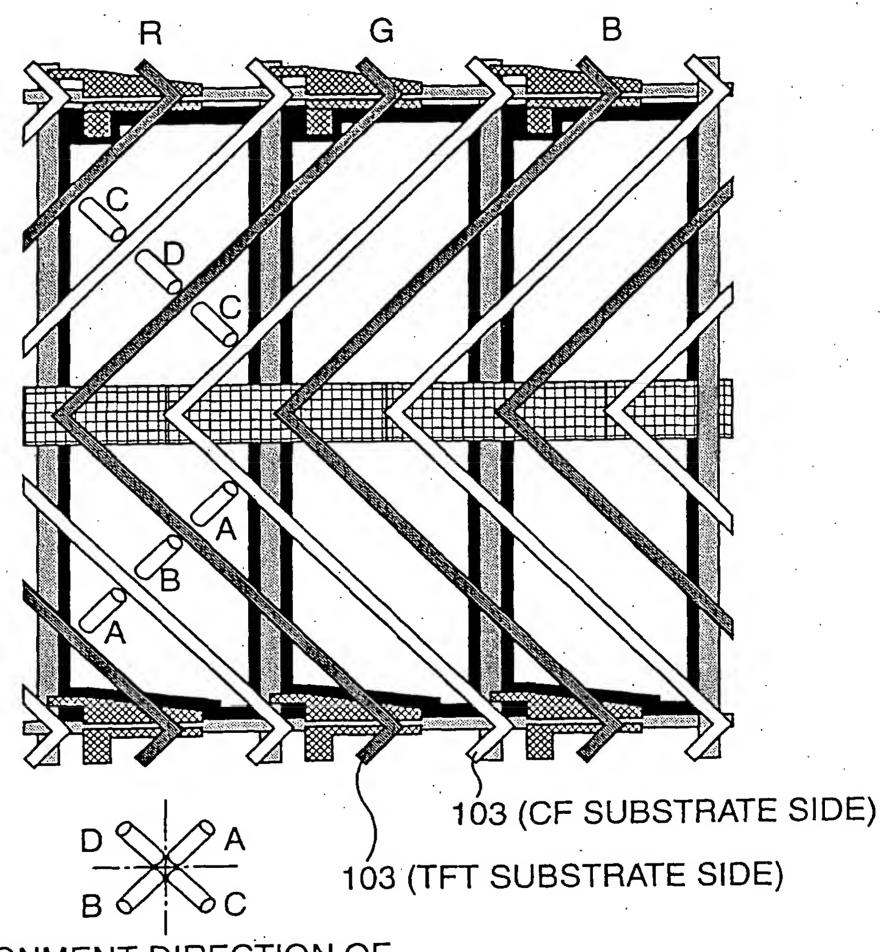
## A REGION WITH NO ELECTRODE ON BOTH OF THE SUBSTRATES



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FIG. 22

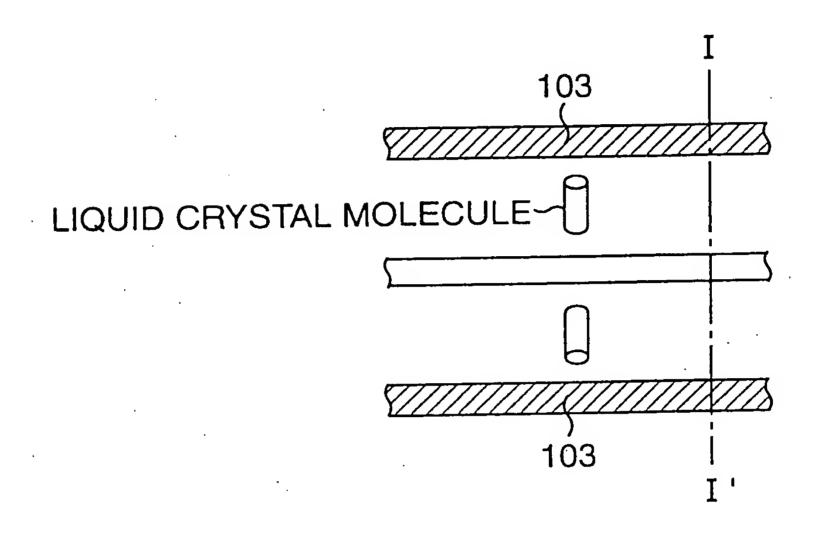


ALIGNMENT DIRECTION OF THE LIQUID CRYSTAL MOLECULE

PIXEL STRUCTURE OF AN MVA LIQUID CRYSTAL DISPLAY (ONE PIXEL)

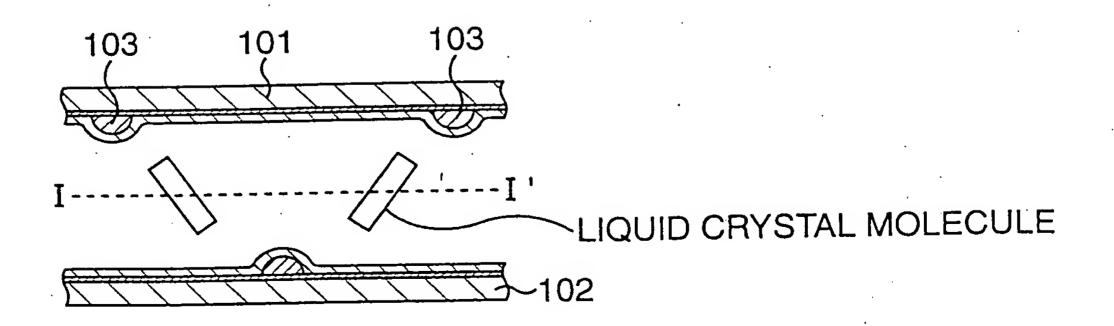
LIQUID CRYSTAL DISPLAY DEVICE . . . Takeda et al. Greer, Burns & Crain, Ltd. (Patrick Burns) Ref. No. 1117.68335 Sheet 20 of 27 (312) 360 0080

FIG. 23A



PLANE VIEW

FIG. 23B



SECTIONAL VIEW

FIG. 24A

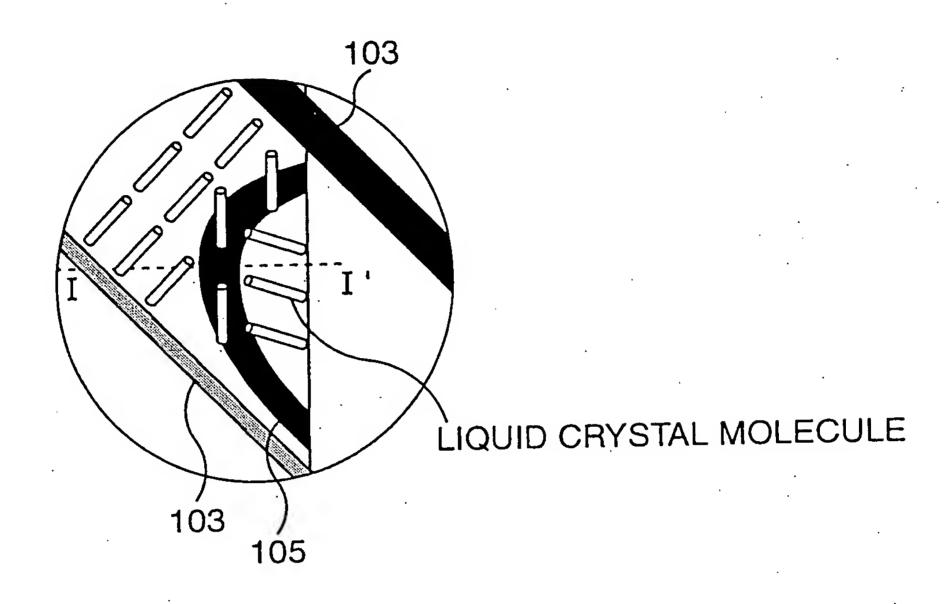
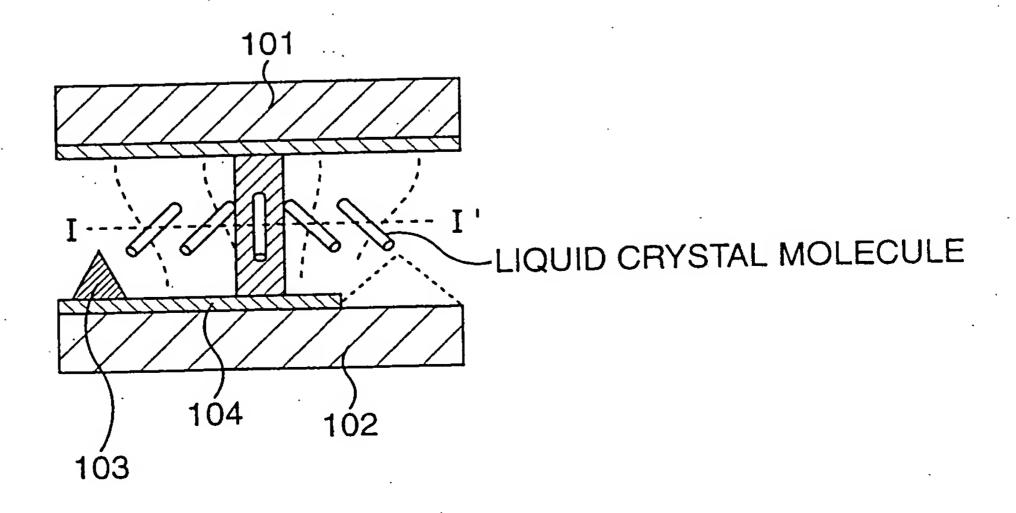
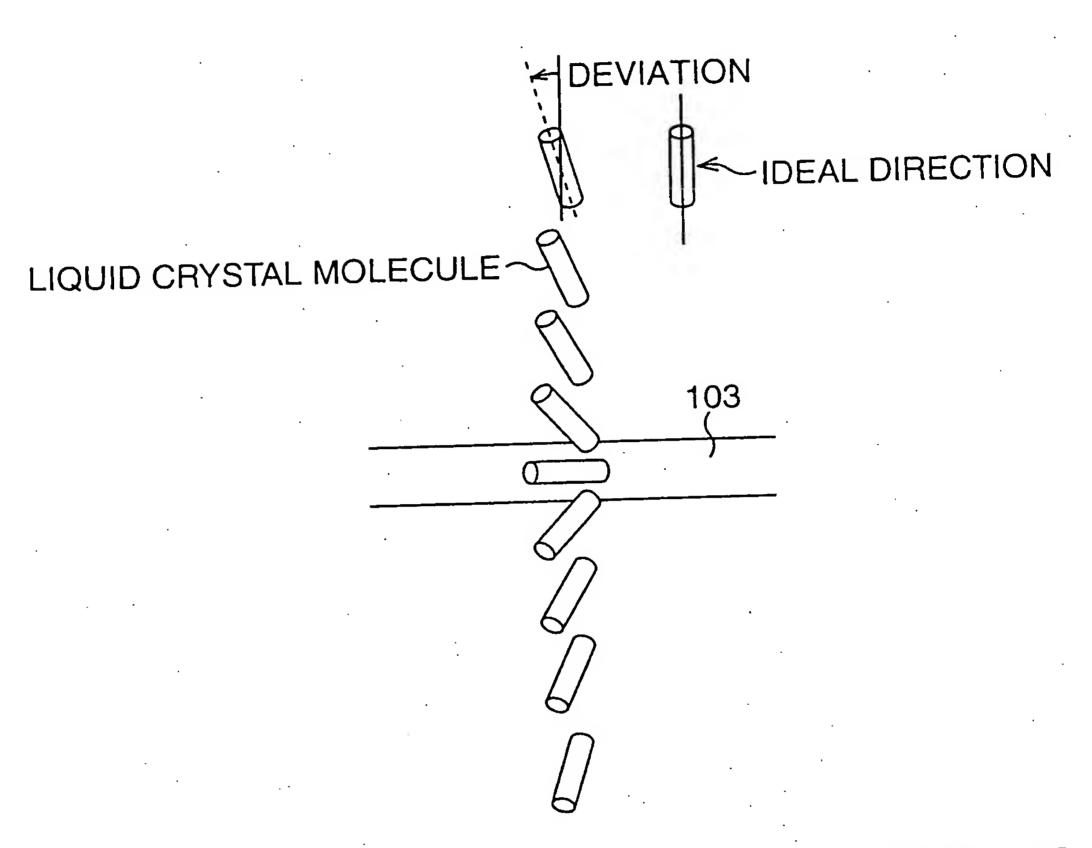


FIG. 24E



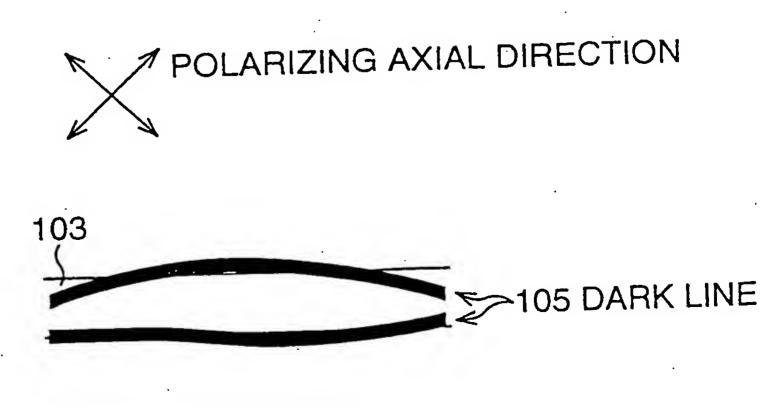
LIQUID CRYSTAL DISPLAY DEVICE . . . Takeda et al. Greer, Burns & Crain, Ltd. (Patrick Burns) Ref. No. 1117.68335 Sheet 22 of 27 (312) 360 0080

FIG. 25A



ALIGNMENT DIRECTION OF THE LIQUID CRYSTAL MOLECULE

. FIG. 25B



OPTICAL APPEARANCE

LIQUID CRYSTAL DISPLAY DEVICE . . .

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FIG. 26A

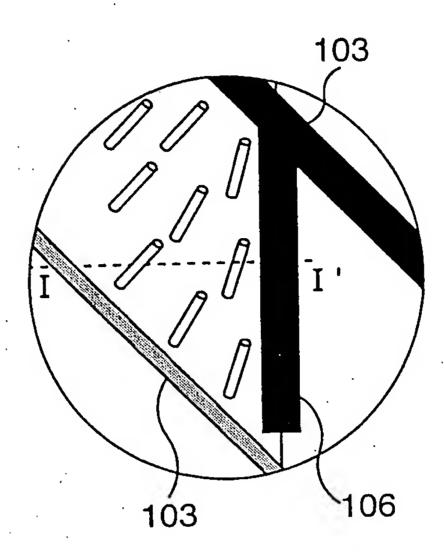
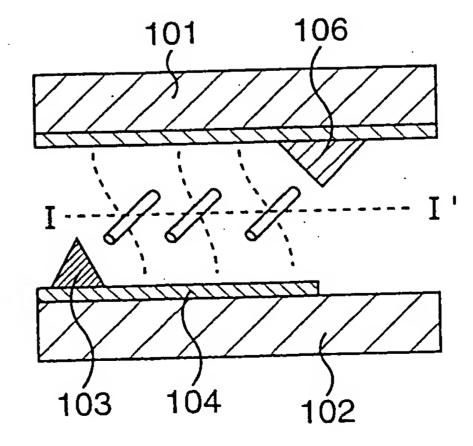
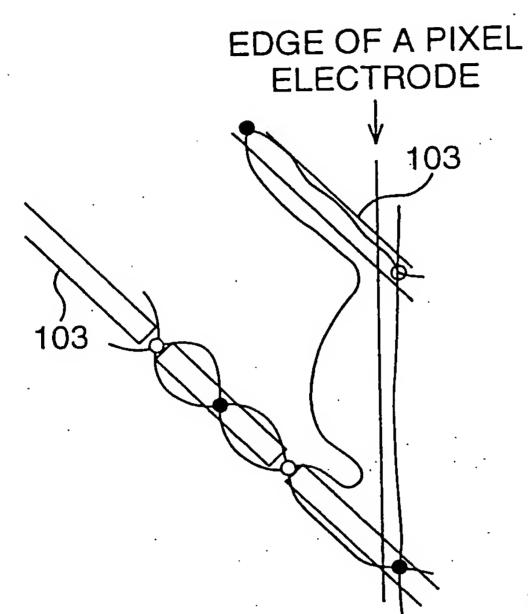


FIG. 26B



LIQUID CRYSTAL DISPLAY DEVICE . . .
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FIG. 27A

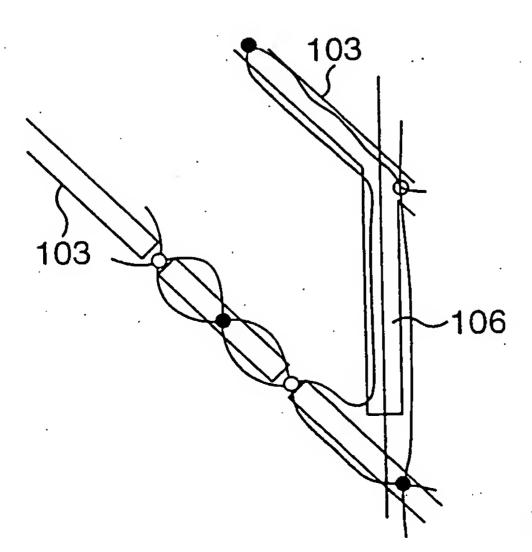


- SINGULAR POINTS OF S
   =-1 ORIENTATION VECTOR
- SINGULAR POINTS OF S
   =+1 ORIENTATION VECTOR



WITHOUT AN AUXILIARY BANK

FIG. 27B



WITH AN AUXILIARY BANK

LIQUID CRYSTAL DISPLAY DEVICE . . . Takeda et al. Greer, Burns & Crain, Ltd. (Patrick Burns) Ref. No. 1117.68335 Sheet 25 of 27 (312) 360 0080

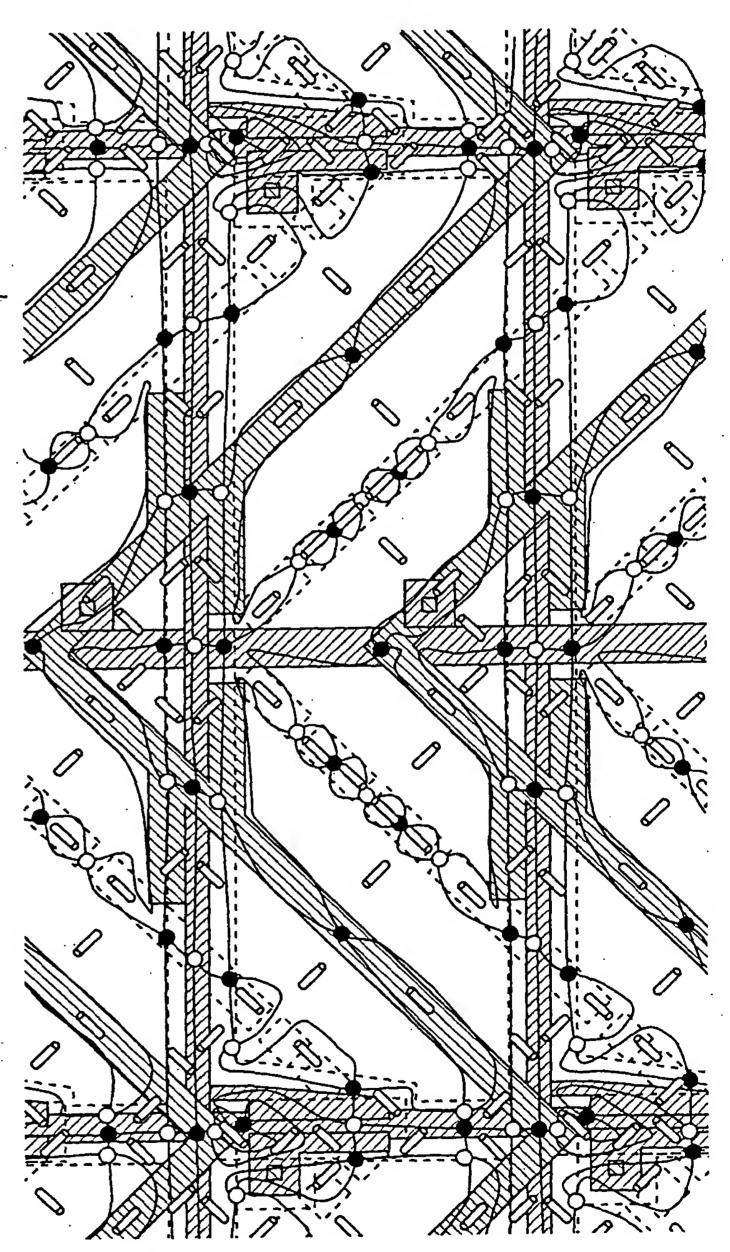
FIG. 28

STRENGTH OF SINGULAR POINTS OF ORIENTATION VECTOR

●S=+1

OS=-1

OBSERVED WITH A TFT SUBSTRATE ON A LOWER SIDE AND A CF SUBSTRATE ON AN UPPER SIDE



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FIG. 29A

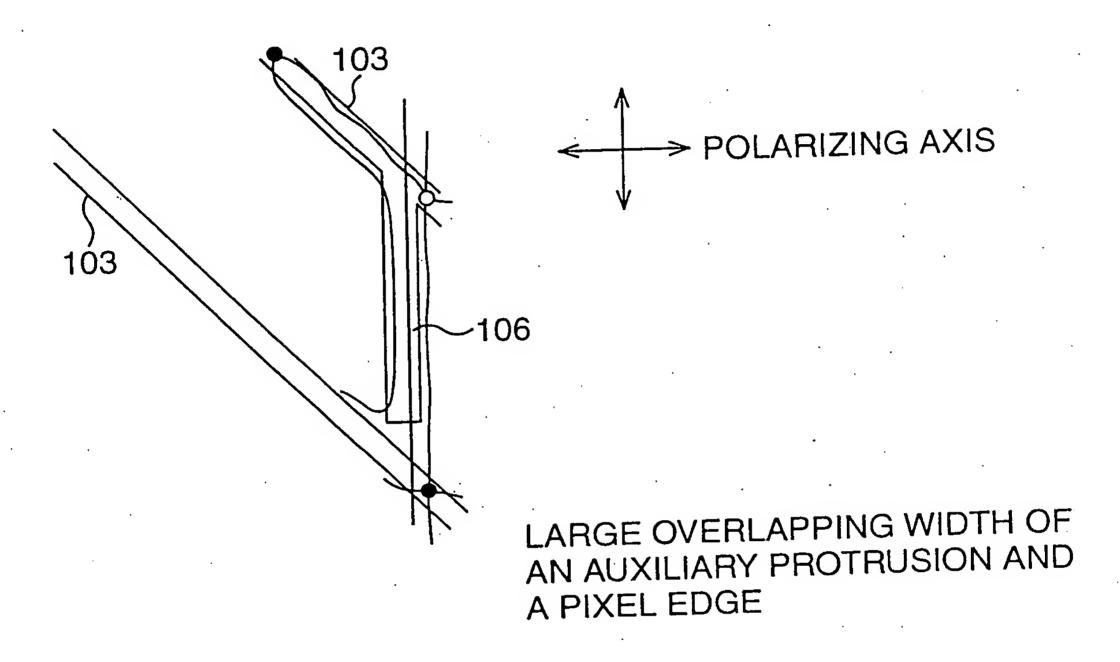
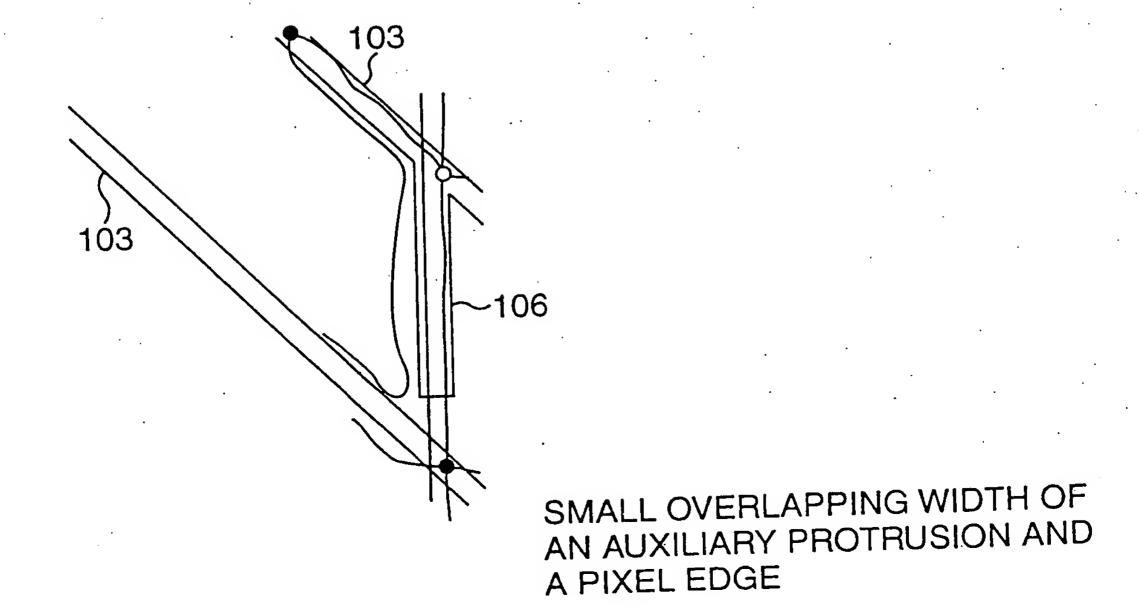
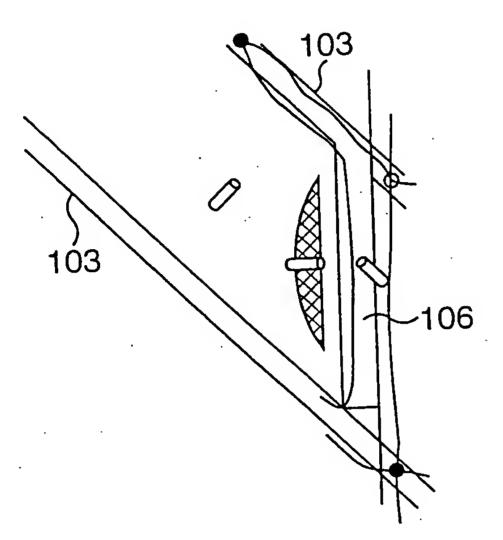


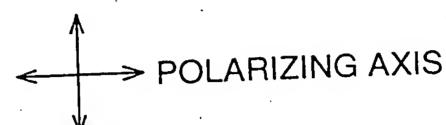
FIG. 29B



LIQUID CRYSTAL DISPLAY DEVICE . . . Takeda et al. Greer, Burns & Crain, Ltd. (Patrick Burns) Ref. No. 1117.68335 Sheet 27 of 27 (312) 360 0080

FIG. 30





LARGE OVERLAPPING WIDTH OF AN AUXILIARY BANK AND A PIXEL (LARGER THAN THAT OF UPPER CASES SHOWN IN FIG.7)